

I B. Tech I Semester Regular Examinations, January, 2015
Basic Electrical Engineering
(Common to CE, ME, EEE, ECE)

Time: 3 hours

Max Marks: 70

PART – A

Answer ALL questions. All questions carry equal marks

2 * 10 = 20 Marks

- 1). a State & Explain the Kirchoff's Current Law with an example. [2]
- b What do you mean by Passive elements in an Electric Circuit? [2]
- c Three resistors each of resistance 6Ω are connected in a star network, determine the resistances if they are transformed into a delta network. [2]
- d Capacitors of $0.2\mu\text{F}$, $0.5\mu\text{F}$, $0.8\mu\text{F}$ are connected in parallel. Determine the effective capacitance and the reactance if they are excited by a supply of 50Hz . [2]
- e Obtain the expression for average value of a Sinosoidal Waveform. [2]
- f What do you mean by Power Factor? Explain. [2]
- g Explain the terms: (i) Bandwidth (ii) Q-factor. [2]
- h What are the limitations of Superposition Theorem? [2]
- i What is the principle of working of a Transformer? [2]
- j Explain the applications of a DC motor. [2]

PART – B

Answer any FIVE questions. All questions carry equal marks

10 * 5 = 50 Marks

2. a) Calculate the effective value of the resistance of the combination of resistances shown in figure 1 and the voltage drop of each resistor when a potential difference of 60V is applied between points A & B [10]

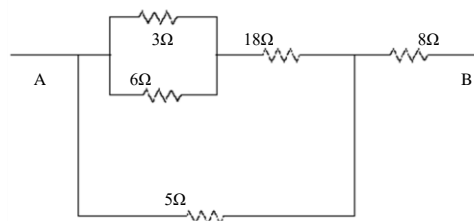


Figure 1

- b) Derive the expression for the resistances of a Star to delta transformation network.

3. a) A circuit consisting of a resistance of 12Ω , inductance of $0.15H$, and a capacitance of $100\mu F$ in series is connected across a $100V$, $50Hz$ supply. Calculate the impedance, current and the power factor of the circuit. [10]
 b) Two impedances $Z_1=(8 + j6)$ and $Z_2=(3 - j4)$ are connected in parallel. If the total current of the combination is $25A$, find the current taken and power consumed by each impedance.
4. a) Explain the concept of resonance and obtain the expression for the resonant frequency of a series RLC circuit. [10]
 b) Explain the procedure for circuit analysis using mesh analysis with an example.
5. a) Use Thevenin's Theorem to find current between terminals A & B in figure 2. All resistors are in Ω [10]

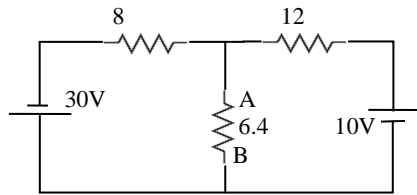


Figure 2

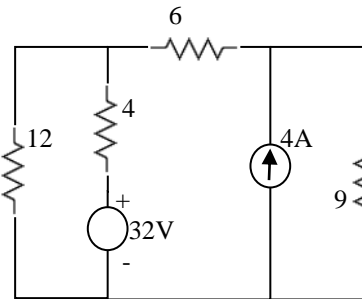


Figure 3

- b) Compute the power dissipated in the 9Ω resistor for the circuit in figure 3 above using Superposition Principle.
6. a) Explain the principle of working of a DC Motor & the significance of Back EMF. [10]
 b) Obtain the expression for the torque of a DC Motor.
7. Compute the equivalent resistance of the circuit between (i) ab (ii) ac (iii) bc for circuit in figure 4 below [10]

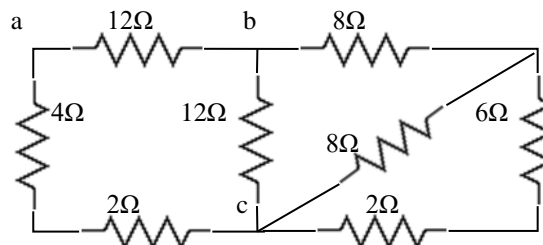


Figure 4

8. a) A Sinusoidal Current Waveform has a peak value of $20A$ and a time period of $0.01sec$. Determine the average value, Frequency, RMS value and the instantaneous value at $3ms$. [10]
 b) A $2000KVA$, $3300 / 240 V$, $50Hz$ 1Φ transformer has 80 turns in the secondary winding. Assuming an ideal transformer, calculate (i) primary and secondary currents on full load, (ii) maximum value of the flux and (iii) the no of primary turns.